

CLAIMS

1. A speaker unit comprising:

a vibrator which has one end and the other end and vibrates in a given direction in response to an incoming signal,

a counter-mass which is provided on said one end of said vibrator, and

a diaphragm which is connected to said vibrator at said other end and outputs sound when it receives vibration from said vibrator, wherein

said counter-mass transmits the vibration from said vibrator in a concentrated manner to said diaphragm side.

2. The speaker unit according to claim 1 which is additionally provided with:

a receiver circuit which receives an external signal transmitted wirelessly and

a battery which supplies electric power to said receiver circuit, wherein

at least one of said receiver circuit and said battery is used as said counter-mass.

3. The speaker unit according to claim 1, wherein:

said vibrator is a magnetostrictive element comprising a giant magnetostrictive material containing Tb, Dy and Fe.

4. The speaker unit according to claim 1, wherein:

a permanent magnet which applies a bias magnetic field to said vibrator is provided on an axis of said vibrator.

5. The speaker unit according to claim 4, wherein:
said permanent magnet is provided on said one end and said other end of said vibrator respectively.

6. The speaker unit according to claim 1, wherein:
said counter-mass is composed of a soft magnetic material.

7. A sound output device comprising:
a vibrator which has one end and the other end and vibrates in a given direction in response to an incoming signal,
a counter-mass which is positioned on said one end of said vibrator and has a given multiple or more of mass than that of said vibrator,
a housing which holds said vibrator and said counter-mass and
a transmission member which transmits vibration generated by said vibrator at said other end to said housing outside.

8. The sound output device according to claim 7, which is provided with:

a first permanent magnet which is positioned between said counter-mass and said vibrator, and

a second permanent magnet which is positioned between said transmission member and said vibrator.

9. The sound output device according to claim 7, wherein:

said sound output device is stick-shaped as a whole by structuring said housing such that the length thereof in the vibrator direction of the vibrator is larger than that in the direction perpendicular to the vibration direction.

10. The sound output device according to claim 7, wherein:

said vibrator is a magnetostrictive element comprising a giant magnetostrictive material containing Tb, Dy and Fe, and

a drive coil is provided around said vibrator in said housing for generating a magnetic field in response to an incoming signal and making said vibrator vibrate with the magnetic field.

11. The sound output device according to claim 7, wherein:

said counter-mass provides an inertia force only in the vibration direction of said vibrator when said vibrator vibrates.

12. The sound output device according to claim 7, wherein:

said counter-mass has a mass 10 to 200 times larger than that of said vibrator.

13. The sound output device according to claim 7, wherein:
a diaphragm which outputs sound when it receives vibration from said vibrator via said transmission member is provided.

14. The sound output device according to claim 13, wherein:
a joint which attaches said housing and said diaphragm to each other is provided.

15. The sound output device according to claim 7, which is further provided with:

a receiver circuit which receives an external signal transmitted wirelessly,

a battery which supplies electric power to said receiver circuit, and

a casing which holds said receiver circuit and said battery, wherein

said casing, and said receiver circuit and said battery held in said casing work as said counter-mass.

16. A sound output device comprising:

a cylindrical housing,

a receiver which is held in the housing and receives an external signal transmitted wirelessly,

a vibrator which is held in said housing and vibrates in the axial direction of said housing in response to the signal received by said receiver, and

a transmission member which transmits vibration from said vibrator to the outside.

17. The sound output device according to claim 16, which is further provided with:

a receiver circuit which receives an external signal transmitted wirelessly,

a battery which supplies electric power to said receiver circuit and

a casing containing said receiver circuit and said battery and held by said housing,

wherein said casing containing said receiver circuit and said battery has a given multiple or more of mass than that of said vibrator.

18. The sound output device according to claim 16, wherein:

said vibrator is a magnetostrictive element comprising a sintered body having an atomic composition of $Tb_x Dy_{1-x} Fe_y$ (wherein, X is 0.25 to 0.50 and Y is 1.7 to 2.0), and

a drive coil is provided around said vibrator in said housing for generating a magnetic field in response to an incoming signal and making said vibrator vibrate with the magnetic field.

19. The sound output device according to claim 16, wherein:

said sound output device is stick-shaped as a whole by structuring said housing such that the length thereof in the

vibrator direction of the vibrator is larger than that in the direction perpendicular to the vibration direction.

20. The sound output device according to claim 7 or 16, wherein:

said sound output device is portable.